UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I

IN THE MATTER: Environmental Protection Agency v. Sun Chemical Corporation Proceedings under §3013 of the Resource Conservation and Recovery Act, 42 U.S.C. §6934	)	RCRA DOCKET NO: I-85-1095 FINDINGS OF FACT, DETERMINATION, AND ORDER REQUIRING SUBMISSION AND IMPLEMENTATION OF PROPOSAL FOR MONITORING, TESTING, ANALYSIS AND REPORTING

PRELIMINARY STATEMENT

The following FINDINGS and DETERMINATIONS are made and ORDER issued pursuant to the authority of Section 3013 of the Resource Conversation and Recovery Act (hereinafter "RCRA"), 42 U.S.C. §6934, as vested in the Administrator of the United States Environmental Protection Agency (hereafter "EPA"), and delegated to the Regional Administrator.

The Respondent to this Order is Sun Chemical Corporation.

FINDINGS OF FACT

1. The Carroll Products site ("the Site") is located in Wood River Junction, Rhode Island. The Site is an approximately triangular piece of land bounded by Route 91 to the northwest, the Pawcatuck River to the east,

and Boston-New York Amtrack line to the south.

2. The Site has been operated by Carroll Products, Inc. since 1971. Operations at the Carroll Products Site has included the manufacture of institutional soaps, detergents, dust control products, and a chemical (diazochloride) used for printing inks and printed circuitry.

3. Prior to 1971, the Site was occupied by Sun Chemical Corporation. Information on file with the EPA indicates that Sun Chemical used the following raw materials in its process: methanol, formaldehyde, powdered lead and zinc, mineral spirits, urea, glyoxal resins, and various other solvents.

4. During inspections conducted by EPA at the Site on April 3 and June 12, 1984, it was determined that prior to and since November 19, 1980, hazardous wastes had been stored on-site for periods greater than ninety (90) days in fifty-five (55) gallon drums and other storage containers.

5. As a result of the above-referenced activity, Carroll Products was a storage facility for wastes identified as hazardous pursuant to Storage Rule No. 3.05 of the State of Rhode Island Rules and Regulations for Permitting and Operating Hazardous Waste Treatment and Storage Facilities.

6. During an inspection conducted by EPA on October 22, 1984, it was determined that Carroll Products had ceased the production of institutional soaps, detergents, dust control products, and diazochloride and had ceased operating as a storage facility for hazardous wastes. In addition, it was determined that the company only produced iron oxide pigment blends and that this pigment blend production did not generate hazardous wastes.

7. Two (2) lagoons are located at the Site: an "active lagoon" and an "inactive lagoon". The lagoons are located adjacent to the wire fence that borders the eastern side of the Site. The active lagoon is approximately 30,000 square feet in size and is part of a marshland that is approximately one acre in size. The inactive lagoon lies directly south of the active lagoon and is approximately 14,000 square feet in size.

8. EPA has taken both liquid and sediment samples from the lagoons. Field sampling was conducted on May 7, 1981 and April 4, 1984. Laboratory analyses of these samples show the presence of hazardous constituents, as defined in 40 C.F.R. Part 261, Appendices VII and VIII, in the lagoon material. The results of these analyses are summarized below:

A. ACTIVE LAGOON

	Levels Detected parts per billion (ppb)
Liquid Samples	**May 7, 1981**
Hazardous Constituents	
Benzene	14
Carbon Tetrachloride	6
Chlorobenzene	3
Cresol	4
Methylene Chloride	130
Phenol	3
Toluene	69
2,4,6 trichlorophenol	6

	Levels Detected (ppb)	
Sediment Samples		
Hazardous Constituents	**May 7, 1981**	**April 4, 1984**
Benzene	4,500	7,200
Chlorobenzene	19	55
Chloroform	18	-
1,2 dichloroethylene	9	-
Methylene Chloride	640	1,100
Tetrachloroethylene	4	47
Toluene	21	45
Trichloroethylene	-	33
	parts per million (ppm)	(ppm)
Arsenic	-	1.6
Beryllium	-	0.4
Cadmium	-	2.1
Chromium	-	50
Lead	110	120
Mercury	-	4.8
Nickel	-	62
Silver	-	1.6
Others		
Copper	-	51
Zinc	260	-

B. INACTIVE LAGOON

Sediment Samples

Hazardous Constituents	Levels Detected (ppb) May 7, 1981	April 4, 1984
Benzene	-	140
Chlorobenzene	-	280
1,2 dichloroethylene	-	16
Methylene Chloride	-	700
Tetrachloethylene	-	29
Trichloroethylene	17	39
	(ppm)	(ppm)
Arsenic	-	15.8
Beryllium	-	0.6
Cadmium	-	2.3
Chromium	-	380
Lead	16,000	3,800
Mercury	-	1.3
Nickel	-	18
Selenium	-	0.2
Others		
Copper	-	106
Zinc	6,100	950

9. One (1) deep well and four (4) shallow wells are located on the Site. The deep well is Carroll Product's water supply well and is approximately 25 feet in depth. The four (4) shallow wells are one and one-quarter (1-1/4) inch galvanized pipe groundwater monitoring wells and are approximately eight (8) to twelve (12) feet in depth.

10. EPA has taken samples from the wells identified in paragraph 9 above. Well-water sampling was conducted on October 20, 1981 and April 3, 1984. Laboratory analyses

of these samples show the presence of hazardous constituents, as defined in 40 C.F.R. Part 261, Appendix VIII. The results of these analyses are summarized below:

A. DEEP WELL

Hazardous Constituents	Levels Detected (ppb) October 20, 1981	April 3, 1984
Benzene	-	9
Methylene Chloride	58	620
Toluene	14	-
	(ppm)	(ppm)
Arsenic	<2	13
Barium	<100	-
Cadmium	2	10
Chromium	<20	<100
Lead	20	<100
Mercury	<0.2	<0.2
Nickel	<20	90
Selenium	<2	<5
Others		
Acetone	-	<50
Cobalt	2	-
Copper	8	20
Zinc	38	670

B. SHALLOW WELLS

Hazardous Constituents	Levels Detected (ppb) April 3, 1984 Well #1	Well #2	Well #3	Well #4
Benzene	3	4	3	6
Chlorobenzene	-	25	-	-
Chloroform	-	1	-	-
1,2 dichloroethylene	-	8	3	19
Methylene Chloride	160	18,000	-	17
1,1,1 trichloroethane	-	1	-	-
Trichloroethylene	-	4	-	11
Other				
Acetone	-	-	-	390

11. On May 7, 1981, EPA took one wet soil sample. The soil sample was taken from a disposal area behind the Site's mixing house

which is located in the southwestern corner of the Site. Laboratory analysis of these samples show the presence of hazardous constituents, as defined in 40 C.F.R. Part 261, Appendix VIII. The results of this analysis are summarized below:

Hazardous Constituents	Levels Detected (ppb)
Benzene	970
Chlorobenzene	1200
Chloroform	9700
Others	
Xylene	9700

12. The hazardous constituents listed in paragraphs 8, 10 and 11 are hazardous wastes as defined in RCRA §1004(5), 42 U.S.C. §6904(5). These constituents have been shown in scientific studies to have among other adverse effects on human health, these described below:

- Benzene is a known carcinogen and has irritating, narcotic, and anesthetic effects on the body. Acute exposure may lead to coma or death through respiratory failure.
- Carbon tetrachloride is a suspected carcinogen and may cause irritation of the eyes, gastrointestinal upset, and dermatitis. Acute exposure may cause serious kidney and liver damage.
- Chlorobenzene is irritating to the skin, and conjunctive and mucous membranes of the upper respiratory tract. Chronic exposures may result in liver, kidney and lung damage, as indicated by animal experiments.
- Chloroform is a suspected carcinogen and may cause irritation of the mucous membranes and the skin. Acute exposure may result in narcosis, liver, heart, and kidney damage.
- Cresol has corrosive action on the skin and mucous

membranes. Absorption may result in damage to the kidneys, liver, and nervous system.

- 1,2 Dichloroethylene is an irritant and a narcotic, and has produced liver and kidney damage in experimental animals.

- Methylene chloride may cause dry, scaly and fissured dermatitis with repeated contact and is a mild narcotic.

- Phenol may cause damage to the central nervous system, dermatitis, and digestive disturbances (vomiting, diarrhea, etc.). Acute exposure may result in damage to the kidneys, liver, pancreas, spleen, and edema of the lungs.

- Tetrachloroethylene may cause dry, scaly and fissures dermatitis with repeated contact. Acute exposure may cause central nervous system depression, hepatic injury and anesthetic death.

- Toluene may cause irritation of the eyes, respiratory tract and dermatitis. Acute exposure predominantly results in central nervous system depression.

- 1,1,1-Trichloroethane acts as a narcotic and depresses the central nervous system.

- Trichloroethylene is a suspected carcinogen and may cause narcosis and anesthesia. Fatalities following severe, acute exposure have been attributed to ventricular fibrillation resulting in cardiac failure.

- 2,4,6 - Trichlorophenol may cause irritation to the skin, digestive system and mucous membranes of the upper respiratory tract.

- Arsenic compounds may cause acute or chronic poisoning. Acute exposure (ingestion) may result in gastrointestinal irritation. Chronic exposure from inhalation or ingestion may result in liver, kidney, and nervous system damage. Inorganic arsenic compounds are carcinogens.

- Barium compounds may cause irritation to the eyes, respiratory tract and dermatitis. Soluble barium salts, such as the chloride and sulfide, are poisonous when taken by mouth.

- Beryllium compounds are suspected carcinogens and may cause dermatitis, chronic skin ulcers, rhinititis and bronchitis.

- Cadmium compounds are suspected carcinogens of the connective, tissue, lungs and liver. Acute exposure (ingestion) may result in kidney and liver damage.

- Chromium compounds have a corrosive action on the skin and mucous membranes. Chromate salts are recognized carcinogens of the lungs, nasal cavity and paranasal sinus.

- Lead compounds are suspected carcinogens of the lungs and kidneys. Acute lead exposure may cause kidney, liver, and nervous system damage.

- Mercury compounds are irritating to the skin and mucous membranes of the upper respiratory tract. Chronic exposure may result in central nervous system and gastrointestinal tract damage.

- Nickel compounds are irritating to the skin and lungs. Nickel is a known carcinogen for the nasal cavity, paranasal sinuses and the lungs. Acute exposure may result in dermatitis.

- Selenium compounds are suspected carcinogens of the liver and thyroid. Chronic exposure may cause pallor, nervousness, depression and digestive disturbances.

- Silver compounds are irritating to the skin and mucous membranes.

13. The well sampling data listed in paragraph 10 shows that hazardous wastes have migrated to groundwater.

14. The continued presence of hazardous wastes in the Site's lagoons could result in the release of hazardous wastes and migration off-site by means of groundwater flow.

15. EPA believes that not enough information presently exists to reasonably ascertain the nature and extent of the hazard associated with the Site. EPA has determined that there is a need to obtain significant further information

to identify and evaluate all possible sources of contamination at the Site, to evaluate the Site's subsurface conditions with respect to hydrogeology and geology, and to assess environmental effects at and adjacent to the Site to ascertain said hazard.

DETERMINATIONS

1. The Carroll Product Site is a facility or site within the meaning of Section 3013 of the Resource Conservation and Recovery Act, 42 U.S.C. §6934.

2. Hazardous wastes are and have been stored, treated or disposed of at the Site.

3. The presence of hazardous wastes at and the release of hazardous wastes from the Site may present a substantial hazard to human health or the environment.

4. Respondent Sun Chemical Corporation is the previous owner and operator of the Site.

5. The Site is not in operation as of the date of the signing of this Order; the present owner of the Site could not reasonably be expected to have actual knowledge of the presence of hazardous wastes at the Site and of its potential for release; Sun Chemical Corporation is the most recent previous owner or operator at the Site who could reasonably be expected to have such knowledge.

ORDER

Accordingly, Sun Chemical Corporation is hereby ORDERED pursuant to Section 3013 of RCRA, 42 U.S.C. §6934, to prepare and submit to EPA, and, upon its approval, to implement a proposal for monitoring, testing, analysis, and reporting of hazardous wastes on and emanating from the Site.

I. PROPOSAL CONTENTS

The proposal shall be inclusive enough to address, but not necessarily be limited to, the following:

A. Review and Assessment of Existing Data

The proposal shall include the results of a review of all existing information and engineering data for the Site. The objective of this review is to identify in detail in the proposal any inadequacies or omissions in the existing information on the Site. Based on the results of this review, the proposal shall include among the tasks described below a list of specific data needs and a set of recommendations of how these needs will be addressed. This review shall specifically analyze the suitability and adequacy of the existing data for determination of the following:

1. The types and quantities of hazardous wastes disposed of at the Site;
2. Past disposal practices employed by the facility operators at the Site;

3. The topographic and hydrogeological features of the Site;

4. The direction and rate of groundwater flow through the Site, including development of a groundwater table contour map;

5. The migration of the contaminants on the Site, their ultimate environmental fate, and their potential for causing future environmental degradation on the Site; and

6. The sources, extent, and composition of contaminants in soils, groundwater, surface water, and sediments on the Site.

B. Hydrogeological Investigation

1. The proposal shall describe a program capable of determining the rate and extent of migration of hazardous wastes or hazardous constituents in the groundwater and shall meet the conditions discussed in paragraphs 2-7 below.

2. The proposal shall include a plan designed to generate the following information:

a) A description of the regional geologic and hydrogeologic characteristics in the vicinity, including:

i) local stratigraphy (soil and unconsolidated sediment cover, bedrock, structural features, and formation origins);

ii) regional hydrogeological flow patterns; and

iii) areas of recharge and discharge;

b) An analysis of any topographic or geomorphic features that might influence the groundwater flow system; and

c) A classification and description of the hydrogeologic properties of all the hydrogeologic units found at the Site (i.e., the aquifers and

any intervening saturated and unsaturated units), including:

i) hydraulic conductivity, porosity;

ii) texture,, uniformity, lithology; and

iii) an interpretation or hydraulic interconnections between saturated zones:

d) Preparation of at least two (2) geologic cross sections showing the extent (depth, thickness, lateral extent) of all hydrogeologic units within the Site property, identifying:

i) sand and gravel deposits in unconsolidated deposits;

ii) zones of significant fracturing or channeling in consolidated deposits;

iii) zones of higher permeability of lower permeability that might direct or restrict the flow of contaminants;

iv) perched aquifers; and

v) the uppermost aquifer (defined as the first saturated zone that may have a potential for migration of contaminants;

e) A description of water level measurement procedures or fluid pressure monitoring procedures, including;

i) water level contour maps and vertical gradient sections;

ii) well or piezometer hydrographs;

iii) an interpretation of the flow system, including the vertical and horizontal components of flow; and

iv) an interpretation of any change in hydraulic gradients;

f) A description of manmade influences that may affect the hydrogeology of the site, identifying:

i) local water supply and production well with an approximate schedule of pumping; and

ii) manmade hydraulic structures (pipelines, french drains, ditches, etc.)

3. The proposal shall include a description of the field methods and other information sources proposed for the study and a summary of which data will be collected by each method. The proposed methods should include, but are not limited to:

a) A program of soil borings, as required to adequately describe the subsurface geology of the Site. The program should provide for the presence of a qualified geologist or geotechnical engineer to log and describe the materials encountered during the boring. The program should also describe the methods proposed to stabilize holes until monitoring wells are installed;

b) A sufficient number of piezometers to characterize groundwater depth and gradient (both horizontal and vertical) over the entire area

of the site; and

c) The use of slug and/or pump tests as appropriate to determine hydraulic conductivity;

4. The proposal shall identify a list of proposed indicator parameters capable of detecting release of hazardous wastes or hazardous constituents into the groundwater. The parameters should be representative of constituents at least as mobile as the most mobile constituents that could reasonably be derived from the Site's wastes and should be chosen after considering:

a) the types, quantities, and concentrations of constituents in wastes managed at the facility;

b) the mobility, stability, and persistence of waste constituents or their reaction products in the unsaturated zone beneath the waste management area;

c) the detectability of the indicator parameters, waste constituents or reaction products in groundwater; and

d) the concentration or value and the natural variation (known or suspected) of the proposed monitoring parameter in background (upgradient) groundwater.

5. The proposal shall include the basis for selecting each proposed indicator parameter, including any analyses or calculations performed. The basis for selection must include chemical analysis of the facility's waste and/or leachate as appropriate. The proposal shall also include parameters to characterize the site-specific chemistry of groundwater at the site, including but not limited to the major anions and cations that make up the bulk of dissolved solids in water (i.e., Cl^-, Fe, Mn, Na^+, SO_4, Ca^+, Mg^+, K^+NO^{-3}, $PO_4^=$, silicate, ammonium)

6. The proposal shall ~~document the field methods~~ provide specifications and design drawings of to be used for data collection and shall include at a minimum, ~~a description of and, where appropriate,~~ design drawings of:

   a) Proposed well locations;

   b) Size and depth of wells;

   c) Well-intake design, including screen slot size and length; filter pack materials and method of filter-pack emplacement. The location of the screens shall be based on the highest readings of an organic vapor detector (HNU or equal).

   d) Type of proposed well casing and screen materials. The choice of well materials shall be

made in light of the parameters to be monitored for and the nature of the leachate that could potentially migrate from the facility. The well materials should: 1) minimize the potential of adsorption and desorption of constituents from the samples; and 2) maintain their integrity for the expected life of the system (at least thirty years);

e) Methods used to seal the well from the surface and prevent downward migration of contaminants through the well annulus; and

f) Description of the methods or procedures used to develop the wells.

7. When developing this plan, Sun Chemical Corporation shall refer to EPA guidance documents to determine the methods and materials that are acceptable to the Agency.

C. Soils, Surface Water and Sediments Investigation

The proposal shall include a program to investigate and determine the location and extent of any and all contamination of on-Site soils, surface waters, and sediments.

D. Sampling and Analysis Plan

1. The proposal shall include a sampling and analysis

plan capable of yielding representative groundwater, soils, surface water, and sediments samples. The plan should include a description of the following elements:

a) Well evacuation procedures including volume to be evacuated prior to sampling and handling procedures for purged well water;

b) Sample withdrawal techniques. Sampling equipment and materials shall be selected to yield representative samples in light of parameters to be monitored for. The sampling protocol will include field measurement of pH, conductivity, and temperature at each well prior to sampling for other parameters;

c) Sample handling and preservation techniques including provision for field-filtration of samples, as appropriate;

d) Procedures for decontamination of non-dedicated sampling equipment between sampling events;

e) Procedures for measuring groundwater elevations at each sampling event;

f) Chain of custody procedures to be used for all phases of sample management;

g) Laboratory analytical techniques for testing constituents in soils, sediments, groundwater, and surface waters including EPA-approved analytical (SW 846) methods and quality assurance quality control procedures;

h) Procedures for locating and identifying on a base map all sample locations;

i) Procedures to determine whether contamination has occurred. The procedure should include:

1) A proposed method (statistical or otherwise) to compare upgradient and downgradient well water that provides a reasonable balance between probability of falsely identifying and failing to identify contamination;

2) A proposed method for data organization and presentation; and

j) Procedures whereby EPA may, upon request receive split samples of any sampling conducted pursuant to the proposal, which samples shall be preserved, packaged, and labeled in accordance with the QA/QC plan.

E. Quality Assurance/Quality Control

The proposal shall contain a plan to be used for all sampling to be considered under this Order, which plan shall address quality assurance and quality control (hereinafter "QA/QC plan"). Environmentally related measurements are defined

as all field and laboratory investigations that generate data. Sun Chemical Corporation shall use quality assurance, quality control, and chain-of-custody procedures in accordance with EPA Guidance Document OAMS-005/80. The proposal shall also ensure that EPA personnel are allowed access to the laboratory utilized by Sun Chemical Corporation for analyses of samples collected during the monitoring program. In addition, said plan shall provide that the laboratory shall analyze samples provided by EPA under its Hazardous Waste Performance Evaluation Program. The QA/QC plan shall address the following points:

1. QA objectives for measurement data, in terms of precision, accuracy, completeness, representativeness, and comparability;
2. Sampling procedures;
3. Sample custody;
4. Calibration procedures, references and frequency;
5. Internal QC checks and frequency;
6. QA reports to EPA;
7. Preventive maintenance schedules;
8. Specific procedures to be used to routinely assess data precision, representativeness, comparability, accuracy and completeness of specific measurement; and
9. Corrective action.

II. REPORTING REQUIREMENTS

A. Submittal of Proposal

Within ~~thirty (30)~~ forty-five (45) days of receipt of this ORDER, Sun Chemical shall submit to EPA for review and approval, a written proposal incorporating the items set forth above and shall include a proposal description, scope of work and schedule. The proposal description shall clearly and concisely describe the problems to be addressed, investigation objectives, long-range investigative approach to be used, reporting expectations and other information that will assist with evaluation of investigation priorities and the proposal. The scope of work shall describe proposed work tasks, address all issues raised in the proposal description, be technically specific, and contain sufficient detail to enable determination of investigation goals, needs, direction, status and proposed schedule.

Each work task described in the scope of work shall include, where applicable, descriptions of: technical approach; tests measurements, sampling, and analyses planned; analytical techniques proposed; equipment to be used; design and construction of environmental monitoring sites; data needs; quality assurance/quality control plans; and means and frequency of reporting to EPA.

B. Implementation of Proposal

The proposed schedule for the implementation of the items set forth above, which shall be included in the proposal shall be such that implementation shall begin within ten (10) days of EPA approval.

C. Reporting of Results

Within one hundred fifty (150) days of initiating implementation of the proposal, Sun Chemical Corporation shall submit to EPA a draft report containing all results including all raw data collected, all calculations performed, and an interpretation of the findings.

EFFECTIVE DATE AND PARTIES BOUND

This order is effective immediately upon receipt thereof by Sun Chemical Corporation unless modified by the Regional Administrator. All times for performance of response activities shall be calculated from that date.

The proposal must be submitted to EPA within thirty (30) days of the effective date.

Please submit your proposal to:

William Walsh-Rogalski, Esq.
U.S. Environmental Protection Agency
Office of Regional Counsel - Room 2203
J.F. Kennedy Federal Building
Boston, Massachusetts 02203
Telephone: (617) 223-0400

In accordance with Section 3013(c) of RCRA, 42 U.S.C. §6934(c), you are entitled to an opportunity to confer with EPA. You may, therefore, within ten (10) calendar days after receipt of this Order, request a conference with Michael R. Deland, Regional Administrator of EPA, Region I, or his designee, to discuss the following: The Order, its applicability to you; the correctness of any factual determinations upon which the Order is based; the appropriateness of any action which you are ordered hereby to take; and any other relevant material issue. At any conference held pursuant to your request, you may appear in person and/or by attorney or other representatives for the purpose of presenting any objections, defenses or contentions which you may have regarding this Order. If you desire such a conference, please contact Atorney Walsh-Rogalski at the above address, within the time set forth above for requesting a conference.

The holding of a conference shall not vary or extend the 30-day time period required for the submission of the proposal.

The Order shall apply to and be binding upon Sun Chemical Corporation, and/or any of its operating divisions, subsidiaries, affilitated and/or related corporations and its successors and assigns.

LIABILITY

If Sun Chemical Corporation fails or refuses to comply with the terms and provisions of this Order, EPA may commence a civil action to require compliance and to assess a civil penalty not to exceed $5,000 for each day during which such failure or refusal occurs.

Section 3013(d) of RCRA, 42 U.S.C. §6934(d), also provides that if EPA determines that the Sun Chemical Corporation is not able to conduct the activities required pursuant to this Order in a satisfactory manner, is not able to conduct the activities contained in the approved proposal, or if actions carried out are deemed unsatisfactory, then EPA may conduct such actions deemed reasonable by EPA. The Sun Chemical Corporation may then be ordered to reimburse EPA for the costs of such activity pursuant to Section 3013(d) of RCRA, 42 U.S.C. §6934(d).

Signed this 30th day of Sept., 1985.

Michael R. Deland

Regional Administrator